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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/677,344	10/02/2000	Balakrishnan Sridhar	327	3540

7590 06/09/2004

Ciena Corporation  
Legal Department  
1201 Winterson Rd  
Linthicum, MD 21090

EXAMINER
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CUNNINGHAM, STEPHEN C

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 06/09/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/677,344	<b>Applicant(s)</b> SRIDHAR ET AL.	
	<b>Examiner</b> Stephen C. Cunningham	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 February 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 7-21 and 23-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-17, 19-21 and 23-25 is/are rejected.
- 7) ☒ Claim(s) 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

1. Claims 1, 2-5, 7, 8, 10, 11, 13, 14, 16, 19, 20, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shima et al. in view of Yang et al. (US 6,215,584).

With respect to claim 1, Shima et al teach an optical amplification device, comprising:

a first active optical fiber with a first end coupled to an optical communication path and an output second end;

a dispersion compensating element coupled to the second end portion of the first active optical fiber;

a second active optical fiber with a first end coupled to the dispersion compensating element and a second end;

a variable attenuator (VAT) connected to the second end of the second active optical fiber;

a third active optical fiber with a first end connected to the output of the variable attenuator; and

a control circuit, sensing an input optical power and outputting the attenuation control signal. See figures 1 and 3, and column 11, lines 27-43.

Yang et al teach a memory circuit storing an attenuation adjustment value and a control circuit that outputs the attenuation control signal to the attenuator, see column 4, lines 1-15. It would have been obvious to modify the apparatus of Shima et al by including in the control circuitry a memory device as taught by Yang et al in order to improve processing time.

With respect to claims 2 and 20, Shima et al teach a photodetector coupled to the first end of the first active optical fiber and a processing unit coupled to the photodetector, but fail to teach a memory device. Yang et al teach a memory device, storing an attenuation factor, coupled to a processing unit. Dispersion compensating elements contribute significant loss to the system and would necessarily be accounted for in an attenuation factor. It would have been obvious to modify the apparatus of Shima et al to provide a memory device storing dispersion compensation power loss in order to provide accurate attenuation control in the apparatus.

With respect to claims 3 and 21, Shima et al teach a control circuit including:

- a first photodetector coupled to the first end of the first active optical fiber;

- a second photodetector coupled to an input port of the dispersion compensating element ;

a third photodetector connected to an output port of the dispersion compensating element;

and a processing unit that outputs an attenuation control signal.

Yang et al teach a memory device, storing an attenuation factor, coupled to a processing unit. Dispersion compensating elements contribute significant loss to the system and would necessarily be accounted for in an attenuation factor. It would have been obvious to modify the device of Shima et al by storing the significant static loss values in a memory device and detecting the signal power to control the attenuator accurately and dynamically.

With respect to claim 4, Shima et al teach a control circuit including:

a first photodetector coupled to the first end of the first active optical fiber;

a second photodetector coupled to the input of the variable attenuator;

a third photodetector coupled to the output of the dispersion compensating element;

a comparator inherent in the gain control;

and a processing unit, the AGC.

Yang et al teach a memory device, storing an attenuation factor, coupled to a processing unit. Dispersion compensating elements contribute significant loss to the system and would necessarily be

accounted for in an attenuation factor. It would have been obvious to modify the device of Shima et al by storing the significant static loss values in a memory device and detecting the signal power to control the attenuator accurately and dynamically.

With respect to claim 5, Shima et al teach a circuit including:

a first photodetector coupled to the first end of the first active optical fiber;

a second photodetector coupled to the input of the variable attenuator;

a third photodetector coupled to the output of the dispersion compensating element;

and a processing unit, the AGC.

Yang et al teach a memory device, storing an attenuation factor, coupled to a processing unit. Dispersion compensating elements contribute significant loss to the system and would necessarily be accounted for in an attenuation factor. It would have been obvious to modify the device of Shima et al by storing the significant static loss values in a memory device and detecting the signal power to control the attenuator accurately and dynamically.

With respect to claim 7, Shima et al teach an amplification device further comprising a filter with an input coupled to the second end of the

second active optical fiber and an output coupled to the VAT. See figures 1 and 3, specifically filter 35 in amplification stage 3.

With respect to claim 8, Shima et al teach an amplification device wherein the filter of claim 7 is a gain-flattening filter. See, for example, column 7, lines 29-31 and 48-49.

With respect to claim 10, Shima et al teach an amplification device further comprising:

a first optical filter connected intermediate the second active optical fiber and the VAT; and

a second optical filter connected intermediate the VAT and the third active optical fiber.

See figures 1 and 3.

With respect to claim 11, Shima et al teach an amplification device wherein the filters of claim 10 are gain-flattening filters. See, for example, column 7, lines 29-31, 48-49 and column 8, lines 10-13.

With respect to claim 13, Shima et al teach that the dispersion-compensating element is a dispersion compensating fiber.

With respect to claim 14, Shima et al teaches a dispersion compensating fiber which is a well known functional equivalent to the dispersion compensating Bragg grating. It would have been obvious to modify the apparatus of Shima et al by substituting a dispersion

compensating Bragg grating for the dispersion compensating fiber as a matter of design choice that produces no unexpected results.

With respect to claim 16, With respect to claim 8, Shima et al teach an amplification device further comprising a first and a second pump coupled to the first and second active optical fibers respectively and wherein the pumps both operate at 980 nm. See column 7, lines 44-49 and column 8, lines 16-28.

With respect to claim 19, Shima et al teach the method, inherent in the apparatus, of controlling comprising:

- amplifying with a first amplification stage;
- dispersion compensating the optical signals;
- amplifying with a second amplifying stage;
- optically attenuating;
- amplifying with a third amplifying stage;
- sensing an input optical power of signals input into the first amplification stage;
- controlling the optical attenuator. See figures 1 and 3.

With respect to claim 23, Shima et al teach the inherent method further comprising filtering the signals intermediate the second and third amplification stages with a gain-flattening filter. See figures 1 and 3, specifically filter 35 in amplification stage 3 and column 7, lines 29-31 and 48-49.



2. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shima et al. in view of Yang et al., as applied to claims 7 and 10, and further in view of Alexander et al.

Shima et al fails to teach service channel monitoring. Alexander et al teach a monitoring apparatus including a service channel transmitter coupled to an input port of an optical filter and a service channel receiver coupled to an output port of said optical filter. It would have been obvious to modify the apparatus of Shima et al by substituting the service channel monitoring device as taught by Alexander for one of the optical filters in order to monitor system performance.

3. Claim 15, 17, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shima et al. in view of Yang et al., as applied to claims 1, 16, and 19, and further in view of Becker et al.

With respect to claims 15, 17 and 24, Shima et al. teaches a three stage optical amplifier where the first stage is low noise, the combination of the first and second stage provide high gain and low noise amplification, and the third stage provides high power amplification (column 6, lines 25-26, 62-64 and column 7, lines 57-60). Shima et al. suggests a low gain first stage amplifier, relative to the pre-stage amplifier in a two-stage

amplifier, in order to increase the acceptable range of input powers.

Becker et al. teach that a multistage amplifier comprises a low-noise, high-gain first stage amplifier and a high power second stage amplifier. By amplifying the input signal with a low noise amplifier greater power in subsequent stages is utilized in amplifying the signal light rather than noise lights. It would have been obvious to modify the apparatus by making both the first and second amplification stages high-gain and low noise amplifiers in order to achieve amplification with reduced noise power.

Regarding claim 25, please see rejections for claim 1, 3 (depending on claim 1), and 15, fully incorporated herein by reference.

It would have been obvious to modify the device of Shima et al by storing the significant static loss values in a memory device and detecting the signal power to control the attenuator accurately and dynamically and to further modify the apparatus by making both the first and second amplification stages high-gain and low noise amplifiers in order to achieve amplification with reduced noise power.

### ***Allowable Subject Matter***

Claim 18 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art fails to teach that limitations:

a plurality of optical receivers, each of which being coupled to a respective one of the plurality of outputs of said optical demultiplexer;

a plurality of received power modules, each of which being coupled to a respective one of said plurality of receivers, each of said plurality of received power modules outputting a respective one of a plurality of power level signals indicative an optical power level at each of said plurality of receivers;

a monitoring circuit coupled to each of said plurality of received power modules, said monitoring circuit receiving the plurality of power level signals and outputting an adjustment signal in response to the plurality of power level signals; and

a plurality of tilt control circuits coupled to each of said plurality of optical amplification devices, each of said plurality of tilt control circuits receiving the adjustment signal from said monitor circuit, said tilt control circuits adjusting a gain tilt associated with each of said optical amplification devices in response to the adjustment signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen C. Cunningham whose telephone number is 703-605-4275. The examiner can normally be reached on Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 703-306-4171. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Art Unit: 3663

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

SCC

*SCC*



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